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# UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No. GEM-30834

First Inventor or Application Identifier Ronald G. Kennedy

Title System and Method for Remote Servicing of In-Field Product

Express Mail Label No. EL343024784US

## APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO:

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1. ☒ \* Fee Transmittal Form (e.g., PTO/SB/17)  
(Submit an original and a duplicate for fee processing)2. ☒ Specification [Total Pages 25] ✓  
(preferred arrangement set forth below)

- Descriptive title of the Invention
- Cross References to Related Applications
- Statement Regarding Fed sponsored R & D
- Reference to Microfiche Appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

3. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 2] ✓

4. Oath or Declaration [Total Pages 4] ✓

- a. ☒ Newly executed (original or copy)
- b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d))  
(for continuation/divisional with Box 16 completed)
- i. ☐ DELETION OF INVENTOR(S)  
Signed statement attached deleting  
inventor(s) named in the prior application,  
see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

\* NOTE FOR ITEMS 1 & 13 IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY  
FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT  
IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

5. ☐ Microfiche Computer Program (Appendix)6. Nucleotide and/or Amino Acid Sequence Submission  
(if applicable, all necessary)

- a. ☐ Computer Readable Copy
- b. ☐ Paper Copy (identical to computer copy)
- c. ☐ Statement verifying identity of above copies

## ACCOMPANYING APPLICATION PARTS

7. ☐ Assignment Papers (cover sheet & document(s))8. ☐ 37 C.F.R. § 3.73(b) Statement ☒ Power of Attorney  
(when there is an assignee)9. ☐ English Translation Document (if applicable)10. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations11. ☐ Preliminary Amendment12. ☒ Return Receipt Postcard (MPEP 503) ✓  
(Should be specifically itemized)13. ☐ \* Small Entity Statement(s) ☐ Statement filed in prior application  
(PTO/SB/09-12) Status still proper and desired14. ☐ Certified Copy of Priority Document(s)  
(if foreign priority is claimed)15. ☐ Other: \_\_\_\_\_

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. \_\_\_\_\_

Prior application information: Examiner \_\_\_\_\_

Group / Art Unit \_\_\_\_\_

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

## 17. CORRESPONDENCE ADDRESS

☒ Customer Number or Bar Code Label

022202

(Insert Customer No. or Attach bar code label here)

or ☐ Correspondence address below

Name

Address

City

State

Zip Code

Country

Telephone

Fax

Name (Print/Type)

Timothy J. Ziolkowski

Registration No. (Attorney/Agent)

38,368

Signature

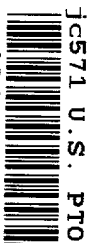
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SYSTEM AND METHOD FOR REMOTE  
SERVICING OF IN-FIELD PRODUCT

Inventor: Ronald G. Kennedy

## SYSTEM AND METHOD FOR REMOTE SERVICING OF IN-FIELD PRODUCT

### BACKGROUND OF THE INVENTION

5           The present invention relates generally to remote servicing of in-field products or equipment, and more particularly, to a system and method for remote servicing of in-field product connecting a centralized on-line service center to the in-field product, such as medical diagnostic equipment, through a portable service interface.

          Medical diagnostic equipment and supporting systems, such as medical imaging  
10       systems, have become increasingly complex in recent years. Examples of such systems include magnetic resonance imaging (MRI) systems, computed tomography (CT) systems, ultrasound and x-ray systems, and positron emission tomography (PET) systems. To add to the complexity of each particular imaging system, many facilities today incorporate a variety of such equipment. In larger facilities, the systems may be  
15       networked to permit common management and control. Further, such systems may be networked with a picture archiving and communication system (PACS) for storing digitized image data for subsequent retrieval and reconstruction. Additionally, teleradiology systems involve transmitting digitized image data to remote locations for review and diagnosis by specialized physicians and/or radiologists.

20           Because medical diagnostic systems are critical elements in the diagnosis and treatment of patients, their use must not be inhibited by a slow response for service or maintenance. Due to the increasing complexity of these systems, trained service personnel are oftentimes not on location with the equipment. Therefore, remote servicing of medical diagnostic equipment has become an important tool in maintaining these  
25       systems.

          Remote servicing of medical diagnostic equipment has traditionally been performed via voice communication between operations personnel and a centralized servicing facility. Operations personnel would call a remote service facility to report

malfunctions and ask questions regarding the proper operation and settings for the equipment. When such queries could not be sufficiently handled by telephone, a service or field engineer was dispatched to troubleshoot the system and provide the needed assistance.

5           Improvements in computer networks have greatly facilitated the task of offering assistance to medical imaging equipment. In particular, rather than having to call a service center and talking to a technician or engineer, or having to await a return call from the service center, network technologies have facilitated proactive techniques wherein the service center may contact the medical diagnostic equipment to check the status of  
10   subscribing equipment. Further advancements have been proposed to provide remote service to medical diagnostic systems in an effort to provide the level of service on a continual and interactive basis as needed by many facilities. In one such system, a service center can interactively receive messages via a network and can respond automatically to the messages if configured correctly. Data required to analyze the state of operation of the  
15   medical diagnostic equipment can be transferred during an electronic connection. This technique greatly facilitates identification of system problems, allows questions to be posed to the subscribing service provider, facilitates transfer of updates and imaging protocols, and permits standard and customized reports to be transmitted to subscribing systems or stations. The interactive aspect of this technique allows the medical diagnostic  
20   facility to remain current on services provided by the centralized service facility and to readily communicate with the centralized service facility.

          While such advancements in the provision of remote services to medical diagnostic equipment has greatly enhanced the level of service and information exchange, such advancements can only be taken advantage of by systems that are networked to the  
25   service center. Non-externally networked medical diagnostic equipment, or systems without interactive service software resident on the in-field product at the customer site may not be able to receive service or use resources of the service center due to the

inability to connect or communicate with the centralized service facility. Typically, a field engineer at the customer site can get additional phone support by calling the on-line service center and talking to the one of the support engineers. However, without a mechanism to access or interface with the remote servicing center, the level of service available to a medical diagnostic system decreases significantly, with the field engineer or technician having to rely upon more traditional remote servicing techniques.

In present systems that are networked to an on-line service center, the on-line service center will dial up the particular system by way of a phone line and connect to the in-field product via a modem that is resident at the customer system in order to access the system. However, for non-networked systems, there is a need to directly connect the in-field product to the on-line service center to allow the field engineers to utilize current service tools in order to bridge a customer system with the on-line service center. Such a system would be particularly useful for systems that do not have the requisite communication software to connect to the on-line service center directly.

It would therefore be desirable to have a system and technique for the remote servicing of the in-field product that can communicate with diagnostic medical systems that do not have the application software that allows for communication with the remote resources such as the on-line service center. It would also be advantageous to have a system that utilizes service tools that are already widely used by field support personnel. It would also be advantageous to have a system that could receive diagnostic evaluations and data from the on-line center, even with a non-networked system.

#### SUMMARY OF THE INVENTION

The present invention provides a system and method for remote servicing an in-field product by utilizing a portable service interface as a connection between an on-line center and an in-field product that overcomes the aforementioned problems.

In one aspect of the invention, a remote servicing communications system for an in-field product is disclosed. The system includes at least one on-line center having access to service software at a centralized facility so as to service in-field products remotely. The system also includes an in-field product at a customer site that is not readily capable of direct communication with the on-line center. At least one portable service interface is operable with the in-field product at the customer site and has software for communication with the on-line center. The system includes a first communications link connecting the portable service interface to the on-line center, and a second communications link connecting the portable service interface with the in-field product.

10 In this manner, there is a connection between the in-field product and the on-line center through the portable service interface.

Accordingly, the present invention also includes a method of providing a remote service communication between an on-line center and an in-field product at a customer site where the in-field product is not readily capable of direct communication with the on-

15 line center. The method includes loading on-line center conductivity software onto a portable service interface and connecting the portable service interface to the in-field product. After such a connection is accomplished, the method includes electronically connecting the on-line center with the portable service interface and accessing data from the in-field product through the portable service interface, such that interfacing between

20 the on-line center and the in-field product may begin. The interfacing step may include transmitting data about the in-field product to the on-line center for the purpose of evaluating the in-field product and generating in-field product evaluation information.

This information is then displayed on the portable service interface. The interfacing step may also include accessing data from the on-line center including configuration files, original incorruptible source of “golden” files, protocols or other software.

According to another aspect of the invention, the invention includes a method of servicing an in-field product not readily capable of direct communication with a remote on-line center. The method includes providing a portable service interface having software for communication with the on-line center, and connecting the portable service interface to the in-field product. Upon electronically connecting the on-line center with the portable service interface, the method includes selecting at least one servicing function available from the on-line center. This is followed by interfacing the in-field product with the on-line center through the portable service interface to conduct diagnostic evaluation of the in-field product or downloading information to the in-field product from the on-line center through the portable service interface. Finally, the method includes displaying the diagnostic evaluation or downloaded information on the portable service interface at the customer site as a result of the selecting step.

Various other features, objects and advantages of the present invention will be made apparent from the following detailed description and the drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

The drawings illustrate the best mode presently contemplated for carrying out the invention.

In the drawings:

- 5        Fig. 1 is a schematic block diagram of a system incorporating the present invention.

Fig. 2 is a flow chart of the process of the present invention as incorporated in the system of Fig. 1.

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## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Fig. 1, an overview block diagram of a medical diagnostic and service system 10 is shown which includes a plurality of stations, such as Customer A referenced with numeral 12, and Customer B referenced with numeral 14. It is understood that the number of stations can be limitless, but two specific embodiments are shown with Customer A and Customer B, which will be further explained hereinafter. The various systems disclosed are configured to be selectively linked to an on-line center 16 by a portable service interface, preferably a laptop computer 22-22a, configured with appropriate connectivity and diagnostic interface software, although any portable service tool that is capable of bridging the on-line center 16 with one of the systems 12, 14 is contemplated by the present invention. Although a single on-line center is shown and described, it is understood that the present invention contemplates the use of multiple on-line centers, each capable of communication with each station. The stations 12, 14, are connected to the on-line center 16 through a communications link 15, 19 which are connected to each portable service interface 22-22a. Such selective linking is desirable to provide upgrades, maintenance, service, and general monitoring of the various systems and equipment at a customer site, which includes accessing data from the systems and transmitting data to the systems, for example.

In general, a customer site, or subscribing station, may have a number of in-field products, such as medical image scanners. Also, the subscribing stations may include a variety of medical diagnostic systems of various modalities. As an example, in the present embodiment, the in-field products may include a number of internally networked medical

image scanners 26 connected to an internal network 24 served by a single scanner 28 having a work station configured to also act as a server, or configured as a stand-alone server without a medical image scanner associated therewith. Alternately, a subscribing station, or customer site 14 can include a number of non-internally networked in-field products such as medical image scanners, 30, 32, 34, each having a computer or work station associated therewith and having an internal modem 36, 38, 40 to facilitate the portable service interfaces 22-22a connecting each station 12, 14, to communications links 15, 19 to ultimately communicate with the on-line center 16. As an alternative to a direct dial-up link, communications can be through an Internet connection. Each portable service interface or laptop 22-22a has remote servicing communications software associated therewith through which the in-field products 26, 30, 32, 34 can be configured, evaluated, serviced, maintained, upgraded, or simply monitored by the on-line center 16, which also has access to service software to service in-field product remotely. It is not necessary in the present invention that the in-field product be absolutely incapable of communication with the on-line center. The present invention contemplates such cases as where an in-field product at a customer site may have the necessary hardware, but because of, for example, termination of servicing contracts, the servicing software is not available to the individual in-field product. Therefore, the laptop 22 provides the necessary servicing and communications software that may have been removed as a result of the expiration of servicing contracts. Additionally, the communications between the portable service interface and the on-line center may be accomplished by a single phone line, or a bank of modems 70 through a portmaster at the on-line center or other connection network.

25           The laptops or other portable service interfaces 22-22a are required since they are the only locations at the customer site where the software for connecting to the on-line

center 16 resides. The in-field products at the particular customer sites for which the invention is applicable lack specific connectivity software which would normally provide the on-line center 16 with the ability to dial up the medical image scanners or other in-field products in order to conduct the desired on-line remote servicing function. Absent this capability, the systems are considered non-networked with the on-line center, and therefore require a bridge or interface, such as the portable service interfaces 22-22a, to make the desired connections.

In the Customer A system 12, the laptop 22 is connected to the internally networked scanners by a communication link connection 13, which preferably is a network cable, such as a local access network cable, so that the laptop 22 or other portable service interface may interact with each of the scanners 26 within the local network, by sending and receiving data. It is understood that each of the network scanners 26 has its own workstation for individual operation and are linked together by the internal network 24 so that the customer can have a centralized management system for each of the scanners. The laptop 22 is also connected via communications link or telephone connection 15 to a modem or Internet link 72 to the on-line center 16. Therefore, the laptop 22 is the sole electronic connection for Customer A between its network scanners 26 and the on-line center 16. Similarly, the laptop 22a for Customer B in system 14 is connected to each individual scanner by communications link 17, which is preferably a serial connection cable. The laptop 22a is also connected via a telephone connection 17 and via a modem or other communications link 19, which may or may not utilize an Internet Protocol (IP) based system, in order to connect with the on-line center 16. Again,

the laptop 22a provides the sole electronic connection or bridge between the scanners 30, 32, 34 of Customer B and the on-line center 16. Without the laptops 22, 22a and their installed connectivity software, such on-line remote servicing connections would not be possible. Although Fig. 1 shows each of these communications links 15, 19 connected through a dedicated network, in another embodiment, it is understood that these links can permit data to be transferred to and from the systems over an open network, such as the Internet as well.

The embodiment shown in Fig. 1 contemplates a medical facility having such systems as magnetic resonance imaging (MRI) systems, ultrasound systems, x-ray systems, computed tomography (CT) systems, as well as positron emission tomography (PET) systems, or any other type of medical imaging system. Such facilities may also provide services to centralized medical diagnostic management systems, picture archiving and communications systems (PACS), teleradiology systems, etc. Such systems can be either stationary and located in a fixed place and available by a known network address, or be mobile having various network addresses. In the embodiment shown in Fig. 1, each customer station 12, 14 can include any combination of the aforementioned systems, or a station may have all of one type of a system. A customer station can also include a single medical image scanner. Mobile diagnostic systems can be configured similarly to that of station 12 or station 14. Such mobile diagnostic systems can include equipment of various modalities, such as MRI, CT, ultrasound, or x-ray systems and are mobilized in order to better service various medical facilities and patients.

The communications between the on-line center and the in-field product of the present invention can be initiated by authorized personnel, such as a field engineer or technician, an on-line engineer or technician, administrative personnel, and/or other such similar authorized personnel, from a laptop computer 22 connected to a customer internal network 24, or from the laptop computer 22a individually connected to each of the scanners 30, 32, or 34. Similarly, the system can be initialized by a computer or workstation 42 in the remote link 20, which can be a part of the on-line center 16, or be separately connected to the on-line center 16 by a dialup link 44 to a web server 46 in the on-line center 16. The on-line center 16 includes a number of processing systems including a mainframe computer 52, an automated support center 54 and the web server 46, for processing customer and product data, creating appropriate configuration files, and selecting service software based on an identification signal received from a subscribing station that identifies the medical image scanner. The processing systems are connectable and can transmit data to one another through a network such as an ethernet 66, or with at least one database 68. It is understood that the single representation of a database in Fig. 1 is for demonstrative purposes only, and it is assumed that there is a need for multiple databases in such a system. A bank of modems 70 is connected to the ethernet 66 to relay data from the on-line center 16 and to the subscribing stations 12, 14 through a plurality of modem links 72 to the portable service interfaces 22-22a.

As previously discussed, each of the systems and substations described herein and referenced in Fig. 1 may be linked selectively to the on-line center 16 via a network 15, 19. According to the present invention, any acceptable network may be employed

whether open, dedicated, virtual private, or so forth. Further, the communications links to the network may be of any acceptable type, including conventional telephone lines, cable modem links, digital subscriber lines, and the like. Each of the portable service interfaces 22-22a is provided with communications interface hardware and software, permitting

5 them to establish network links and exchange data with the on-line center 16. With the present invention, the portable service interfaces 22-22a are provided with interactive software so as to configure the systems and exchange data between the stations and the on-line center 16.

In operation, the field engineer or other service personnel would take the portable

10 service interface, or in this case the laptop 22, 22a, connect it to a communications link such as telephone connection 15, 19 at, for example, a hospital where the in-field product would reside or other customer site, and then connect the laptop 22, 22a to the network port or serial port via communications links 13, 17 on the particular customer's system. The laptops 22, 22a then act as the bridge or interface between the on-line center and the

15 customer in-field products. The portable service interface sends a data message to the on-line center identifying the medical image scanner. The on-line center then selects service software, which resides on the laptop, based on the medical image scanner's identification and can, if needed, automatically download the selected service software to the medical image scanner. It is understood that the term "service software" includes, but is not

20 limited to, software updates, repair software, diagnostic software, data files, or any other electronic files for use with a particular in-field product. The on-line center can then perform a desired function, such as diagnostic evaluations, upgrading software,

downloading files, protocols or other software from the on-line center. In some cases, it may be desirable to download certain "golden" files, which are source code files which are compiled and known at the on-line center to be an uncorrupted file, and that are in a secure location such that they cannot be corrupted. Therefore, such original source files if  
5 desired may be downloaded through the laptops 22, 22a and into the customer systems. Although the above-enumerated functions are preferred, it is contemplated that any remote resource functions that are suitable for transmission from the on-line center to the customer site are contemplated by the present invention. The goal is to provide the customer with the opportunity to have an on-line support engineer at the on-line center,  
10 through the field engineer's laptop 22-22a, and provide real time assistance and information for the particular scanner of interest.

Fig. 2 shows a process flow chart incorporating and overviewing the present invention. Each of the aforementioned components, referred to in Fig. 1, are specifically designed to enable connections initiating by a field engineer, or from the remote link 20.  
15 In a preferred embodiment, the on-line center includes network servers and server software designed to provide for interactive exchange of data via the network link. Such servers may be based on any known or suitable software or protocol for exchanging data. For example, such protocol can include the point-to-point protocol (PPP) employing Internet protocol (IP) packets, hypertext transfer protocol (HTTP), or any other data  
20 exchange means. Preferably, the servers are designed to process and transfer raw data or processed data, such as image data processed into a standard format. Finally, the servers are preferably equipped to support HTTP applications and include a browser capable of

displaying interactive pages, such as those found in HTML, XTL, or other language configurations, and to support JAVA applications, applets, servlets, and similar code for carrying out the functional details of a browser and as described herein.

Referring to Fig. 2 in more detail, the initial check 80 is performed to determine whether the portable service interface or field engineer (FE) interface includes the remote resource communication software which will allow communication with the on-line center 16 or other remote resource. If not 82, the remote resource communication software is installed 83 on the portable service interface. If the FE interface already has the software 84, then the portable service interface is properly equipped to accompany the field engineer to a customer site, such as on a service request. While at the customer site, the field engineer connects the portable service interface to the non-networked system 86. By non-networked, it is meant that the system does not have the communication software or hardware to network with the on-line center. After this connection is made, it is possible to access data 88 from the system or system network if the medical diagnostic scanner is part of a local access network. The portable service interface is then able to be utilized as a remote resource interface 90 by providing a connection from the portable service interface to the remote resource 92 such as the on-line center. This connection may be made to the on-line center by the software on the laptop or portable service interface dialing a preprogrammed number through a phone line connecting to the on-line center. Alternately, the portable service interface can connect to the on-line center through a global network system, such as the Internet. The connection may also be made by the



field engineer providing a telephone number and/or IP address to the on-line center, with the on-line center initiating the connection with the field engineer's laptop.

After the connection to the remote resources made, it is then necessary to determine which remote resource function is desired 94. A check is made to determine whether it is desired to analyze and evaluate the system for diagnostic purposes 96. A check is also made to determine whether it is desired to access information such as software, protocols, specific files and the like from the remote resource 98. Other checks may be made for other desired service functions. If it is not desired to analyze and evaluate the system 102 or if it is not desired to access information from the remote resource 100, the system determines whether additional resource functions are necessary 104. If analysis and/or evaluation is desired 96, 108, data is transmitted to the remote resource 110 and diagnostic evaluation results and analysis are received from the remote resource 112 with the results being displayed on the field engineer portable service interface 114. If no additional remote resource functions are necessary 104, 116, the process is complete. If the FE desires access to remote resource information 118, that information is downloaded 120 from the remote resource and transmitted 122 from the remote resource to the non-networked system. Following this, the system checks to determine whether additional remote resource functions are necessary 104. If no additional resources are required 116, the process is complete.

The present invention is designed to promote remote servicing communication between in-field product and an on-line service center through a portable service interface. Accordingly, the invention includes a method of servicing an in-field product not readily

capable of direct communication with a remote on-line center. The method includes providing a portable service interface having software for communication with the on-line center, and connecting the portable service interface to the in-field product. Upon electronically connecting the on-line center with the portable service interface, the method includes selecting at least one servicing function available from the on-line center. The in-field product is then interfaced with the on-line center through the portable service interface to conduct diagnostic evaluation of the in-field product or downloading information or software to the in-field product from the on-line center. The method optionally includes displaying the diagnostic evaluation or downloaded information on the portable service interface at the customer site as a result of the selecting step.

The invention also includes a remote service and communication system for in-field products. The system includes at least one on-line center having access to service software at a centralized facility so as to service in-field product remotely. The service software can include upgrade software, replacement software, repair software, system documentation and related data, or any other type of electronic data useful to the in-field product. The system includes an in-field product located at a customer site that is typically not readily capable of direct communication with the on-line center. A portable service interface is operable with the in-field product at the customer site and has software for communication with the on-line center. A first communications link is provided to connect the portable service interface to the on-line center and a second communication link connects the portable service interface with the in-field product to complete a

connection between the in-field product and the on-line center through the portable service interface.

In one application, the connection between the in-field product and the on-line center is used to conduct diagnostic evaluation of the in-field product. In a preferred embodiment, the in-field product is a medical image scanner and the on-line center contains many different versions and types of service software designed for utilization with a wide range of medical image scanners. After the portable service interface sends a data message identifying the medical image scanner, the on-line center selects service software based on the medical image scanner identification and automatically downloads the selected service software to the medical image scanner or executes the needed software from the portable service interface. The portable service interface can be a laptop computer having loaded therein remote resource communications software to automatically communicate with the on-line center and transfer files, or data, therebetween.

The present invention has been described in terms of the preferred embodiment, and it is recognized that equivalents, alternatives, and modifications, aside from those expressly stated, are possible and within the scope of the appending claims.

CLAIMS

1. A remote servicing communication system for in-field product comprising:  
  
at least one on-line center having access to service software at a centralized facility so as to service in-field product remotely;
- 5 an in-field product at a customer site that is not readily capable of direct communication with the on-line center;  
  
at least one portable service interface operable with the in-field product at the customer site and having software for communication with the on-line center;  
  
a first communications link connecting the portable service interface to
- 10 the on-line center; and  
  
a second communications link connecting the portable service interface with the in-field product to complete a connection between the in-field product and the on-line center through the portable service interface.
2. The system of claim 1 wherein the connection between the in-field product and the on-line center is utilized to conduct a diagnostic evaluation of the in-field product.

3. The system of claim 1 wherein the in-field product is a medical image scanner and the on-line center contains service software designed for utilization with a wide variety of medical image scanners, and wherein after the portable service interface sends a data message identifying the medical image scanner, the on-line center selects  
5 service software based on the medical image scanner identification and automatically downloads the selected service software to the medical image scanner or executes the selected service software from the portable service interface.

4. The system of claim 1 wherein the connection between the in-field product and the on-line center is utilized to access data from the on-line center.

5. The system of claim 4 wherein the accessed data from the on-line center includes at least one of a configuration file, a golden file, a protocol and a software program.

6. The system of claim 1 wherein the portable service interface sends a data message signal to the on-line center identifying the in-field product such that the on-line center selects service software specifically designed for the in-field product.

7. The system of claim 1 wherein the second communication link connecting the portable service interface to the in-field product is one of a serial cable and a local area network cable.

8. The system of claim 1 wherein the portable service interface is a laptop computer having loaded therein remote resource communications software to automatically communicate with the on-line center and transfer data therebetween.

9. The system of claim 1 wherein the connection to the on-line center provides access to a remote on-line support engineer to provide real time assistance with the in-field product through the portable service interface.

10. A method of providing remote service communication between an on-line center and an in-field product at a customer site where the in-field product is not readily capable of direct communication with the on-line center comprising:

- loading on-line center connectivity software on a portable service interface;
- connecting the portable service interface to the in-field product;
- electronically connecting the on-line center with the portable service interface;
- accessing data from the in-field product with the portable service interface; and
- interfacing between the on-line center and the in-field product with the portable service interface.

11. The method of claim 10 further comprising the steps of transmitting data identifying the in-field product to the on-line center for evaluating and servicing the in-

field product, and automatically selecting service software at the on-line center, and generating in-field product evaluation information and displaying the in-field product evaluation information on the portable service interface.

12. The method of claim 10 wherein the interfacing step includes accessing data from the on-line center including at least one of a configuration file, a golden file, a protocol and a software program.

13. The method of claim 10 wherein the in-field product is a medical image scanner and further comprises automatically selecting at the on-line center service software based on a specific identification of the medical image scanner.

14. The method of claim 10 further comprising the step of automatically checking whether a field service engineer requests an analysis/evaluation, and if so, transmitting system data to the in-field product and performing an analysis/evaluation of the in-field product.

15. The method of claim 14 further comprising displaying results of the analysis/evaluation so that the field service engineer can monitor the analysis/evaluation.

16. The method of claim 10 wherein the connecting step further includes connecting the portable service interface to the in-field product by one of a serial cable and a local area network cable.

17. The method of claim 10 further comprising the steps of automatically checking to see whether a field service engineer requests access to remote resource information, and if so, downloading the remote resource information to the in-field product.

18. The method of claim 17 further comprising the step of displaying a remote resource information to the in-field service engineer.

19. The method of claim 10 wherein the electronically accessing step occurs through a global computer network system.

20. The method of claim 10 wherein the electronically connecting step further includes providing access to a remote on-line support engineer to provide real time assistance with the in-field product through the portable service interface.



21. A method of servicing an in-field product not readily capable of direct communication with a remote on-line center comprising:

providing a portable service interface having software for communication with an on-line center;

5 connecting the portable service interface to the in-field product;  
electronically connecting the on-line center with the portable service interface;

10 from the portable service interface, selecting at least one servicing function available from the on-line center resulting in at least one of the following:

interfacing the in-field product with the on-line center through the portable service interface to conduct a diagnostic evaluation of the in-field product;

15 downloading information to the in-field product from the on-line center through the portable service interface; and

displaying one of the diagnostic evaluation and the downloaded information on the portable service interface as a result of the selecting step.

22. The method of claim 21 wherein the in-field product is a medical image scanner and further comprising the steps of transmitting a data message identifying the medical image scanner from the portable service interface to the on-line center, automatically selecting service software at the on-line center based on the medical image

scanner identification, and automatically downloading the selected service software to the medical image scanner.

23. The method of claim 21 further comprising the steps of automatically checking whether a field service engineer requests an analysis/evaluation, and if so, transmitting system data to the in-field product and performing an analysis/evaluation of the in-field product, and displaying results of the analysis/evaluation so that the field service engineer can monitor the analysis/evaluation.

24. The method of claim 21 further comprising the steps of automatically checking to see whether a field service engineer requests access to remote resource information, and if so, downloading the remote resource information to the in-field product, and displaying a remote resource information to the in-field service engineer.

SYSTEM AND METHOD FOR REMOTE  
SERVICING OF IN-FIELD PRODUCT

## ABSTRACT

A system and method for remote servicing of an in-field product at a customer site. The remote servicing system includes a portable service interface, typically a laptop computer, which is utilized to connect a remote servicing on-line center with the in-field product, such as a medical image scanner. The portable service interface includes

5 software not resident with the in-field product to permit such servicing functions as diagnostic evaluations of the in-field product, as well as downloading configuration files, original source files, protocols and other software from the on-line center through the portable service interface at the customer site. The field engineer or other operator is able to provide service functions to in-field products that are not networked or are not readily

10 networked with the on-line center and that do not have the on-line center connecting software resident on the portable service interface.

# FIG. 1

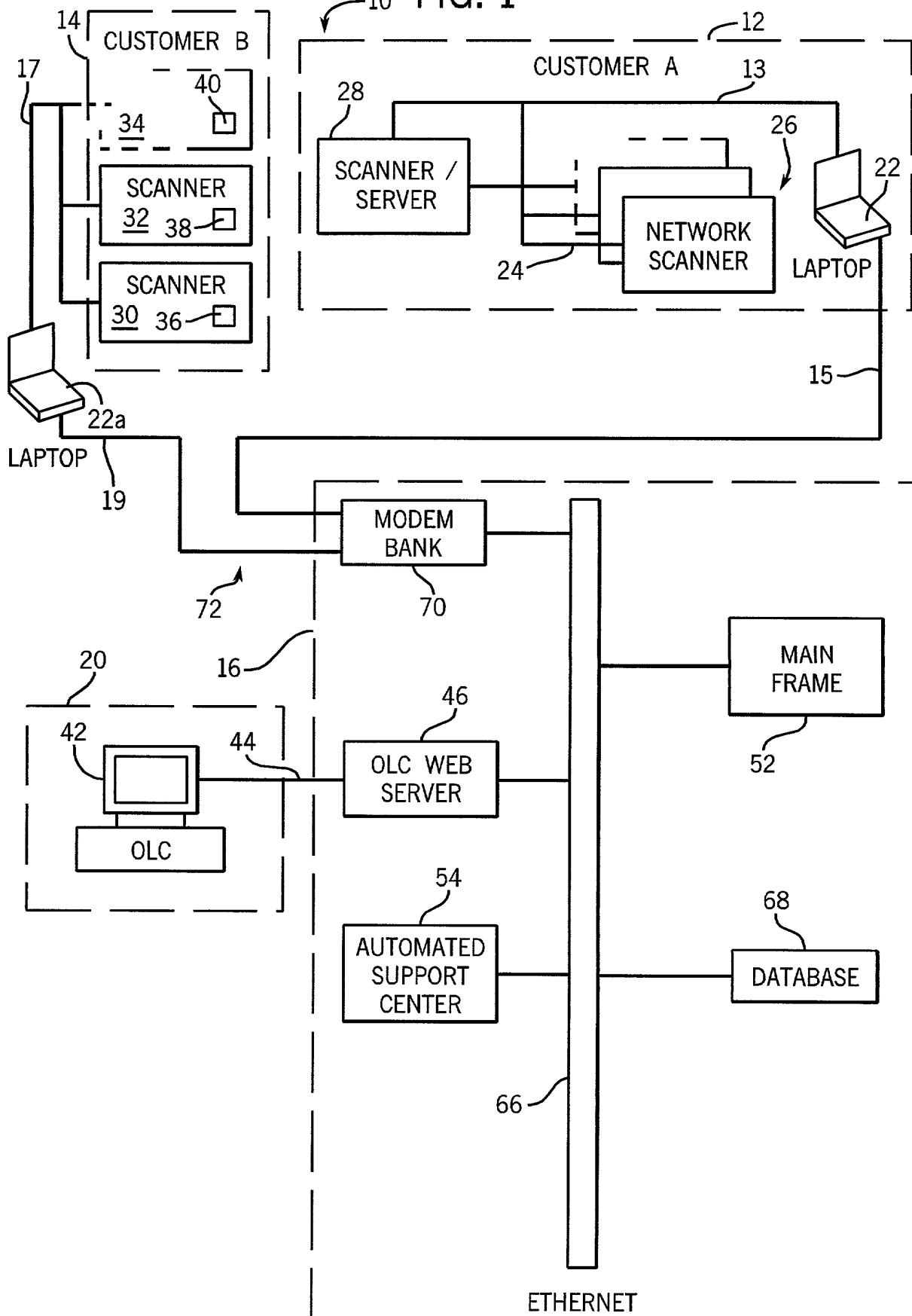
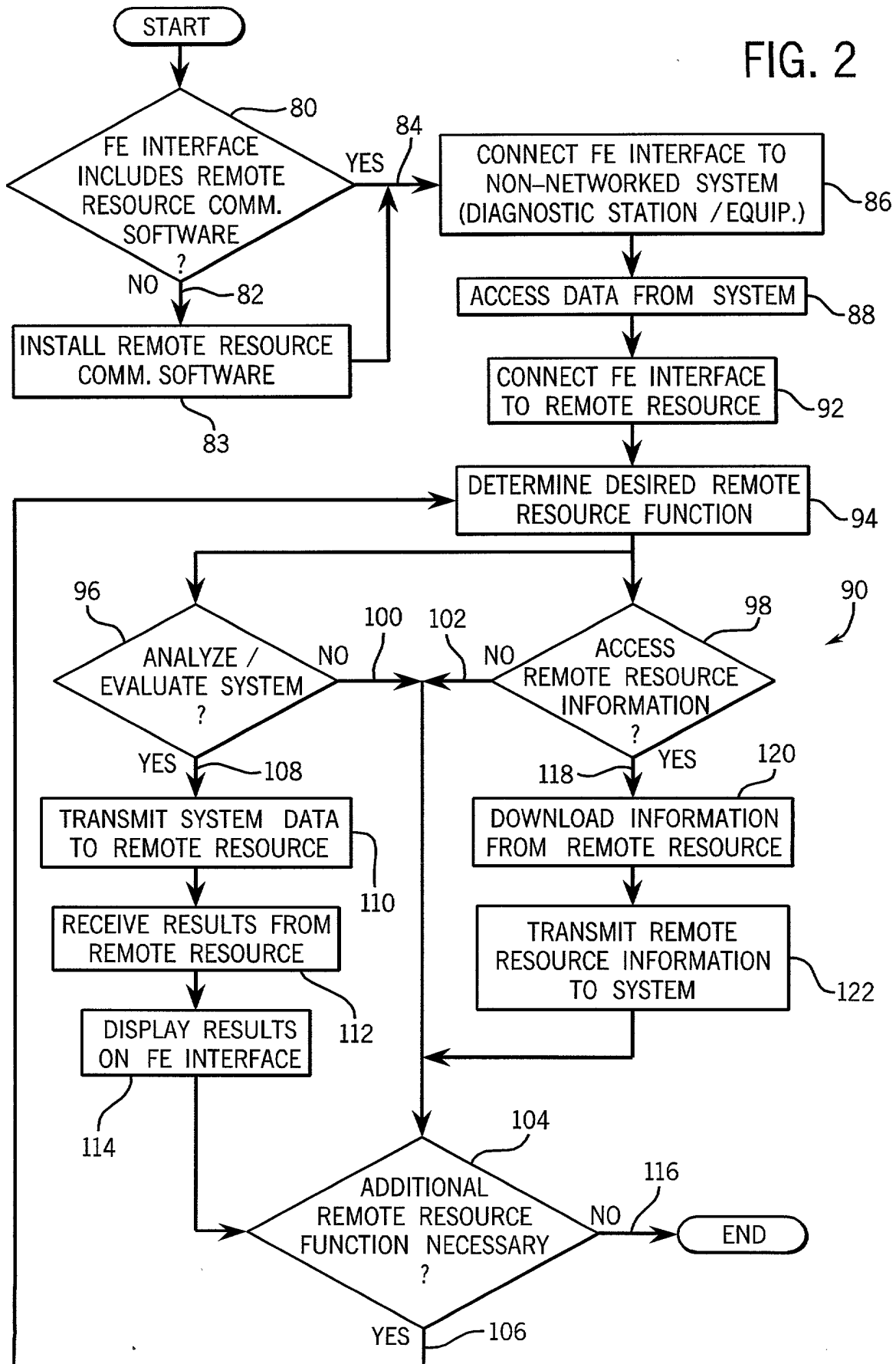


FIG. 2



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**COMBINED DECLARATION AND POWER OF ATTORNEY**

---

As a below named inventor, I hereby declare that:

**TYPE OF DECLARATION**

This declaration is of the following type

- ☒ original
- ☐ design
- ☐ supplemental
- ☐ national stage of PCT
- ☐ divisional
- ☐ continuation
- ☐ continuation-in-part (CIP)

**INVENTORSHIP IDENTIFICATION**

My residence, post office address and citizenship are as stated below next to my name, I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**SYSTEM AND METHOD FOR REMOTE  
SERVICING OF IN-FIELD PRODUCT****SPECIFICATION IDENTIFICATION**

the specification of which:

- (a) ☒ is attached hereto.
- (b) ☐ was filed on as ☐ Serial No. or ☐ Express Mail No., as Serial No. not yet known and was amended on (if applicable).
- (c) ☐ was described and claimed in PCT International Application No. and as amended under PCT Article 19 on (if any).

# ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information

- ☒ which is material to patentability as defined in 37, Code of Federal Regulations, §1.56
- ☒ and which is material to the examination of this application namely, information where there is a substantial likelihood that a reasonable examiner would consider it important in deciding whether to allow the application to issue as a patent.
- ☒ In compliance with this duty there is an information disclosure statement in accordance with 37 CFR 1.98 herein attached.

## PRIORITY CLAIM

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

- ☒ No such applications have been filed.
- ☐ Such applications have been filed as follows:

PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS  
(6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION  
AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. §119

COUNTRY	APPLICATION NO.	DATE OF FILING	PRIORITY CLAIMED
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S)  
(34 U.S.C. § 119(e))

I hereby claim the benefit under Title 35, United States Code, § 119(3) of any United States provisional application(s) listed below:

PROVISIONAL APPLICATION NUMBER

FILING DATE

CLAIM FOR BENEFIT OF EARLIER US/PCT APPLICATION(S)  
UNDER 35 U.S.C. 120

- ☐ The claim for the benefit of any such applications are set forth in the attached ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR CONTINUATION-IN-PART (C-I-P) APPLICATION.

ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS  
(6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION

- ☒ No such applications have been filed.  
☐ Such applications have been filed as follows:

COUNTRY	APPLICATION NO.	DATE OF FILING	PRIORITY CLAIMED
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

POWER OF ATTORNEY

I hereby appoint the following attorney(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

Gary R. Plotecher	Reg. No. 27,830
Timothy J. Ziolkowski	Reg. No. 38,368
Alexander R. Kuszewski	Reg. No. 41,920
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- ☐ Attached as part of this declaration and power of attorney is the authorization of the above-named attorney(s) to accept and follow instructions from my representative(s).

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DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURES

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Inventor's signature Ronald G. Kennedy  
Date 12-29-99 Country of Citizenship USA  
Residence S52 W34370 Highway GG, Dousman, WI 53118

■ This declaration ends with this page